

REMARKS

The present application was filed on November 14, 2000 with claims 1 through 23. Claims 1 through 23 are presently pending in the above-identified patent application. Claims 1, 13, 16, and 22 are proposed to be amended herein.

In the Office Action, the Examiner rejected claims 1-23 as being directed to non-statutory subject matter. The Examiner also rejected claims 1-4, 8-9, 13-19, and 21-23 under 35 U.S.C. § 102(b) as being anticipated by McAulay, A.D. and Oh, J.C., Improved Learning in Genetic Rule-Based Classifier Systems, Systems, Man and Cybernetics, 1991; Decision Aiding for Complex Systems, Conference Proceedings, 1991 IEEE International Conference, October 13-16, 1991, Pages 1393-1398, Vol. 2 (hereinafter McAulay et al.), and rejected claims 5-7, 10-12, and 20 under 35 U.S.C. §103(a) as being unpatentable over McAulay et al. in view of Lewis, David D., An Evaluation of Phrasal and Clustered Representations on a Text Categorization Task, Proceedings of the Fifteenth Annual International ACM SIGIR Conference on Research and Development in Information Retrieval, June 1992, pages 37-50 (hereinafter Lewis).

The present invention is directed to a data classification method and apparatus for labeling unknown objects. The disclosed data classification system employs a learning algorithm that adapts through experience. The present invention
5 classifies objects in domain datasets using data classification models having a corresponding bias and evaluates the performance of the data classification. The performance values for each domain dataset and corresponding model bias are processed to identify or modify one or more rules of experience. The rules of experience are subsequently used to generate a model for data classification. Each rule of experience
10 specifies one or more characteristics for a domain dataset and a corresponding bias that should be utilized for a data classification model if the rule is satisfied. The present invention dynamically modifies the assumptions (bias) of the learning algorithm to improve the assumptions embodied in the generated models and thereby improve the quality of the data classification and regression systems that employ such models. The
15 disclosed self-adaptive learning process will become increasingly more accurate as the rules of experience are accumulated over time.

Section 101 Rejections

Claims 1-23 were rejected as being directed to non-statutory subject matter. In particular, the Examiner asserts that claims 1, 8, 13, 16, and 21-23 are not claimed to be practiced on a computer and that it is clear that these claims are not limited to practice in the technological arts. The Examiner further asserts that none of the claims are limited to practical applications in the technological arts, that Applicants fail to define a useful, concrete and tangible result, and do not specify the associated practical application with the appropriate level of specificity. The Examiner also finds that the Applicants manipulated a set of abstract "input data" to solve mathematical problems in the abstract and that the result of such manipulations is not statutory. Regarding the "system" and "computer readable medium" recitals in claims 16-23, the Examiner asserts that the invention is still found to be non-statutory.

Under Section 101, "any new and useful process, machine, manufacture, or composition of matter" is patentable. 35 U.S.C. §101. It is recognized, however, that despite the broad scope of section 101, "laws of nature, physical phenomena and abstract ideas" cannot be patented. *Diamond v. Chakrabarty*, 447 U.S. 303, 309, 206 U.S.P.Q. (BNA) 193, 197 (1980).

The Examiner asserts that Claims 1-23 are not claimed to be practiced on a computer and that it is clear that these claims are not limited to practice in the technological arts. To the contrary, however, each of the independent claims are expressly directed to a practical method of (or system for) "classifying data." Thus, each of these claims are clearly tied to a practical application. A process that is limited to a practical application of an abstract idea or mathematical algorithm in the technological arts is patentable. See Examination Guidelines for Computer-Related Inventions, Section IV. B. 2. b. (ii).

In any event, the analysis does not stop there. The Supreme Court has stated that the "[t]ransformation and reduction of an article 'to a different state or thing' is the clue to patentability of a process claim." *Gottshalk v. Benson*, 409 U.S. 63, 70, 175 U.S.P.Q. (BNA) 676 (1972). In other words, claims that require some kind of transformation of subject matter, which has been held to include intangible subject matter, such as data or signals that are representative of or constitute physical activity or

objects, have been held to comply with Section 101. *See, for example, In re Warmerdam*, 31 U.S.P.Q.2d (BNA) 1754, 1759 n.5 (Fed. Cir. 1994) or *In re Schrader*, 22 F.3d 290, 295, 30 U.S.P.Q.2d (BNA) 1455, 1459 n.12 (Fed. Cir. 1994).

Each independent claim includes at least one transformation. For example, independent claims 1, 16 and 22 **modify** the bias of one or more data classification models, based on a performance evaluation. Thus, a modified data classification model is provided. Claims 8, 21 and 23 **classify** objects and **select** a data classification model for classifying a domain dataset by comparing characteristics of the domain dataset to rules. Thus, an object classification is provided. Finally, claim 13 processes performance values for each combination of domain dataset and said bias to **adjust** one or more rules for subsequent data classification. Thus, adjusted rules are provided.

Applicants submit that each of the claims 1-22 are in full compliance with 35 U.S.C. §101, and accordingly, respectfully requests that the rejection under 35 U.S.C. §101 be withdrawn.

Independent Claims 1, 8, 13, 16 and 21-23

Independent claims 1, 8, 13, 16 and 21-23 were rejected under 35 U.S.C. § 102(b) as being anticipated by McAulay et al.

Regarding claim 1, the Examiner asserts that McAulay teaches classifying objects in a domain dataset using a data classification model, said data classification model having a bias (FIG. 1, lines 2-3). Regarding claim 8, the Examiner asserts that McAulay teaches one or more rules, each of said rules specifying one or more characteristics of said domain datasets (FIG. 1, lines 4-5).

Applicant notes that McAulay teaches a rule-based learning algorithm that searches “any properly represented domain of knowledge structures for ones with higher associated measures of performance.” (Page 1393, Section II.A.) McAulay, however, does not disclose selecting data classification models based on *characteristics of a domain data set*. Independent claims 1, 13, 16, and 22, as amended, require selecting a data classification model based on a *meta-feature that characterizes a domain data set*. Support for this amendment may be found, for example, at page 8, lines 16-20, of the original specification. Independent claim 8, 21, and 23 require selecting a data

classification model for classifying a domain dataset by comparing characteristics of said domain dataset to said rules.

Thus, McAulay et al. do not disclose or suggest selecting a data classification model based on a *meta-feature that characterizes* a domain data set, as required by independent claims 1, 13, 16, and 22, as amended, and do not disclose or suggest selecting a data classification model for classifying a domain dataset by comparing characteristics of said domain dataset to said rules, as required by independent claims 8, 21, and 23.

Additional Cited References

Lewis was also cited by the Examiner for disclosing a classifier using meta-features. Regarding metafeatures, Applicants note that Lewis teaches that “most current indexing languages represent documents as tuples or vectors of numeric or binary values, with *each value corresponding to an indexing term.*” (Page 38, Section 2.) Lewis than teaches that, “for clarity, we therefore call the features of indexing terms metafeatures.” (Page 38, Section 2.2). *Metafeatures are therefore features of indexing terms* (the individual values representing a document) and not domain datasets. More importantly, Lewis does not disclose selecting data classification models based on a *meta-feature that characterizes a domain data set.*

Thus, Lewis does not disclose or suggest selecting a data classification model based on a meta-feature that characterizes a domain data set, as required by independent claims 1, 13, 16, and 22, as amended, and does not disclose or suggest selecting a data classification model for classifying a domain dataset by comparing characteristics of said domain dataset to said rules, as required by independent claims 8, 21, and 23.

Dependent Claims 2-7, 9-12, 14-15 and 17-20

Dependent claims 2-4, 9, 14-15, and 17-19 were rejected under 35 U.S.C. § 102(b) as being anticipated by McAulay et al. and dependent claims 5-7, 10-12, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over McAulay et al. in view of Lewis.

Claims 2-7, 9-12, 14-15 and 17-20 are dependent on claims 1, 8, 13, and 16, respectively, and are therefore patentably distinguished over McAulay et al. or Lewis

(alone or in any combination) because of their dependency from amended independent claims 1, 8, 13, and 16 for the reasons set forth above, as well as other elements these claims add in combination to their base claim.

All of the pending claims, i.e., Claims 1-23, are in condition for allowance and such favorable action is earnestly solicited.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to
5 contact the undersigned at the telephone number indicated below.

The Examiner's attention to this matter is appreciated.

Respectfully submitted,



10 Date: March 11, 2004

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